Deliverable for Task 5 of Contract W912PP-04-P-0028 Modification 0001

The original idea to develop a way to run a Water Operations model without having a intimate knowledge or understanding of URGWOM was to develop a pre processor program outside RiverWare. A user knowledgeable in RiverWare and URGWOM would select model slots that could be changed and not cause simulation problems during a run. A user without intimate knowledge or understanding of URGWOM could make reasonable changes to values in some or all of the selected slots and evaluate model results. A post processor program would track the model changes allowing the user to archive model changes. Presentation of this idea to the URGWOM technical team resulted in the conclusion that this concept would be more useful as an option within RiverWare. Consequently CADWES developed the scenario manager that became available with release 4.6.1 of RiverWare and later snapshots and patches.

The scenario manager allows a user knowledgeable in RiverWare and URGWOM to select slots for which input value(s) can be changed and to set limits on the changes. The selected slots determined by the URGWOM Technical Team are in the spreadsheet wateropslots.08.05 on the enclosed CD. Once these slots have been entered into the scenario manager and if the model is saved as a baseline model the model cannot be changed. Input values can be changed temporarily and these changes saved in a scenario file apart from the baseline model. A user without intimate knowledge or understanding of URGWOM can develop a scenario that includes all or selected slots for which input value(s) can be modified. The scenario is saved documenting changes to model input. The saved scenario can be opened and used to run the baseline model with the changed model input at a later time. A baseline model uses input values saved in the scenario file but the model can not be saved with the changed input values or with output obtained from a model run using the changed input values. However, the model can be saved using a 'save as non baseline model' option and all output values will be saved in the model. If this option is used the scenario used to change model input is no longer connected to the saved model unless the user names the model and scenario in such a way that the names help preserve the connection.

To verify that model results are the same for models changed by going directly to the object and slot in a model (manual changes) and changing the value and changing the same slots to the same values as above using the scenario manager a 2005 Annual Operating Plan model was used. The model WaterOps.Jan2005.50%.model.gz. was selected. Two scenarios were used to check results of changing model input. One scenario changed selected channel capacities. These changes are summarized in the spreadsheet ChnlCapacityChanges and the worksheet ChannelChanges that is on the enclosed CD. Model results are compared by exporting selected slot values from a model changed manually and from another model changed using the scenario manager. These data sets were loaded into the ChnlCapacityChanges spreadsheet. Output values that were compared are Rio Chama flow at the Chamita gage, reservoir storage in Cochiti, Rio Grande flow at the Central gage, and reservoir storage in Elephant Butte. There are worksheets for each of the data sets selected for comparison. Note that for the manual and

scenario manager changes plots of the output values show these values are identical and different from the run with no channel capacity changes.

The other scenario decreased flow at the Little Navajo, Navajo, and Rio Blanco inflows by 50 percent. This decreased inflow into the Rio Chama system and is shown in the spreadsheet AzoteaChanges and the worksheet Inflows that is on the enclosed CD. Note that inflows changed manually and using the scenario manager are identical but different than in the model with no changes to the 3 inflows. The same output values used with the first scenario were used in this scenario to compare the manually changed and scenario manager changed input values. Note that for the selected output data sets there is no change in the output values for the base run or for either of the changed model runs. In order to determine that changes to inflow at the 3 sources of flow to the Azotea diversions resulted in reasonable simulations additional data sets were exported from the 3 model runs. Azotea Outlet inflow data sets are shown in the AzoteaChanges spreadsheet and the AzoteaOutlet worksheet. Differences in AzoteaOutlet inflow data between the base run model and the 2 changed models are identical. The differences in Azotea Outlet inflow between the base run and the changed models is always greater than 50 percent because diversion rules determine the diversion from the inflow at each of the San Juan Chama diversion structures. At the point water is released from Heron Reservoir, the HeronOutflow worksheet, in the AzoteaOutlet spreadsheet, the differences between the base run model and the changed model releases are negligible but the manually changed and scenario changed outflows are identical. Flows in the Rio Chama at Chamita for all models are nearly identical and downstream of this gage all modeled flows are identical.

The scenario manager allows a user without intimate knowledge or understanding of URGWOM to simulate the river system using modified model input, save selected results of the model or the complete model, document changes that were made to model input, and to rerun the modified model if desired. The baseline model DemoWaterOps.Jan2005.50%.08.05.BL.gz is the baseline model used for all scenario manager changed model runs and is included in the enclosed CD in the directory Models. The base run model DemoWaterOps.Jan2005.50%.model.08.05.gz was used to develop the baseline model and was used to develop the manually changed model runs. It is also in the directory Models. Also included in this directory are the models in which manual changes were made to input, ManChangeWaterOps.Jan2005.50%.model.08.05.Chnlcap.gz, is the channel capacity model with changes and ManChangeWaterOps.Jan2005.50%.model.08.05.azoteareduced.gz is the model with inflow to the Azotea diversions reduced 50 percent. Models changed using the scenario manager, DemoWaterOps.Jan2005.50%.model.08.05.ChnlCaps.gz the channel capacity model, and DemoWaterOps.Jan2005.50%.model.08.05.azoteareduced.gz, the model with inflow to the Azotea diversions reduced, are in the Models directory. Scenarios used to run the baseline model using modified input values are AbiquiuChannelCap.scn used for modified channel capacity simulation and ReducedAzotea.scn for reduced inflow to Azotea diversions simulations are also in the directory Models. All model runs were made using the rule set waterops.ruleset.08.03.05.